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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/886,659	06/21/2001	David A. Brown	2037.2018-000	4746
21005	7590	11/23/2004		
HAMILTON, BROOK, SMITH & REYNOLDS, P.C. 530 VIRGINIA ROAD P.O. BOX 9133 CONCORD, MA 01742-9133			EXAMINER SHINGLES, KRISTIE D	
			ART UNIT 2141	PAPER NUMBER

DATE MAILED: 11/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/886,659	<b>Applicant(s)</b> BROWN, DAVID A.	
	<b>Examiner</b> Kristie Shingles	<b>Art Unit</b> 2141	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 21 June 2001.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 October 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>10/01/01</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

*Claims 1-23 are pending.*

### ***Priority***

1. Acknowledgment is made of applicant's claim for domestic priority under 35 U.S.C. 120. The certified copy has been filed in Provisional Application No. 60/212,966 filed on 6/21/2000.

### ***Information Disclosure Statement***

2. The information disclosure statement (IDS) submitted on 10/01/2001 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the Office. An initialed and dated copy of Applicant's IDS form 1449, is attached to the instant Office action.

### ***Drawings***

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: **120, 308 and 312**. Corrected drawing sheets, or amendment to the specification to add the reference character(s) in the description, are required in reply to the Office action to avoid abandonment of the application. Any amended replacement-drawing sheet should include all of the figures appearing

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on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "104" has been used to designate both **Search Key** and **Forwarding Engine** (of Fig.2). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement-drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

5. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: **108**. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement-drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is

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being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Double Patenting***

6. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

7. **Claims 1-23** are provisionally rejected under the judicially created doctrine of double patenting over Claims 1-25 of copending Application No. 09/886,650. This is a provisional double patenting rejection since the conflicting claims have not yet been patented.

The subject matter claimed in the instant application is fully disclosed in the referenced copending application and would be covered by any patent granted on that copending application since the referenced copending application and the instant application are claiming common

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subject matter, as follows: a lookup table comprising a plurality of mappers indexed by portions of a search key to output a route index for the search key or partial indexes to subsequent mappers, wherein the search key length is variable and expandable and stored in a single location in one of the lookup units.

Furthermore, there is no apparent reason why applicant would be prevented from presenting claims corresponding to those of the instant application in the other copending application. See *In re Schneller*, 397 F.2d 350, 158 USPQ 210 (CCPA 1968). See also MPEP § 804.

### ***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. Claims **1-23** are rejected under 35 U.S.C. 102(e) as being anticipated by *Hunter et al* (USPN 6,223,172).

a. **Per claim 23**, *Hunter et al* teach an apparatus for providing a route index corresponding to a search key comprising:

- a forwarding engine which receives the search key and provides a portion of the search key as a mapper key (**Abstract and Figures 4-6; longest match search**

**processing involves a forwarding database for receiving search keys and hashing portions of the search key into mask keys); and**

- **a lookup table coupled to the forwarding engine, which receives the mapper key from the forwarding engine, the lookup table comprising (Abstract and Figures 6, 7, 9 and 10; hash table and routing table implicate lookup table):**
- **a plurality of mappers which are indexed by portions of a search key and partial indexes to output the route index to the forwarding engine for the search key or partial indexes to subsequent mappers (col.1 line 58-col.2 line 67, col.3 line 64-col.4 line 6, col.6 line 52-col.8 line 4, col.8 line 45-col.11 line 14 and Figures 6, 7, 9 and 10; a hash table contains a plurality of bins comprising address records which are indexed according to the decimated portion of the search/mask key, subsequent masks are produced by address-sensitive decimation of the former mask, pointers to the entries of the forwarding database may also be stored in the hash table); and**
- **a partial index feedback loop by which a mapper is indexed in multiple passes with multiple portions of the search key (col.3 lines 1-10, col.7 line 64-col.8 line 34 and col.9 lines 17-36; partial index feedback is accomplished through generations of new hash indices as the mask is progressively shortened upon multiple iterations of the decimation logic).**

b. **Claims 1, 8, 15 and 22** are substantially equivalent to the limitations of claim 1 and are therefore rejected under the same basis.

c. **Per claim 2, *Hunter et al*** teach the lookup table as claimed in Claim 1 wherein the route index corresponding to the search key is stored in a single location in one of the plurality of mappers (col.7 lines 51-63, col.8 line 54-col.9 line 10 and col.9 line 47-col.10 line 19; hash indices corresponding to search/mask keys are stored in the bins of the hash table).

d. **Claims 9 and 16** are substantially equivalent to claim 2 and are therefore rejected under the same basis.

e. **Per claim 3, *Hunter et al*** teach the lookup table as claimed in Claim 1 wherein the length of the search key is variable (col.3 lines 27-29, col.5 lines 54-65 and col.7 lines 3-15;

**example of network prefixes with varying lengths indicate search keys and masks with variable lengths).**

f. **Claims 10 and 17** are substantially equivalent to claim 3 and are therefore rejected under the same basis.

g. **Per claim 4, *Hunter et al* teach the lookup table as claimed in Claim 3 wherein the search key includes a 32-bit IPv4 address (col.4 lines 31-38; invention is applicable to 32-bit IPv4 addresses).**

h. **Claims 11 and 18** are substantially equivalent to claim 4 and are therefore rejected under the same basis.

i. **Per claim 5, *Hunter et al* teach the lookup table as claimed in Claim 4 wherein the route index corresponding to the search key is found after a first search of the plurality of mappers (col.9 line 27-col.10 line 19; a hash index associated with the search key may be found/produced after searching the hash bins).**

j. **Claims 12 and 19** are substantially equivalent to claim 5 and are therefore rejected under the same basis.

k. **Per claim 6, *Hunter et al* teach the lookup table as claimed in Claim 3 wherein the search key includes a 128-bit IPv6 address (col.4 lines 31-38; invention is applicable to 128-bit IPv6 addresses).**

l. **Claims 13 and 20** are substantially equivalent to claim 6 and are therefore rejected under the same basis.

m. **Per claim 7, *Hunter et al* teach the lookup table as claimed in Claim 1 wherein the partial index is a subtree index (col.7 line 64-col.8 line 20 and col.8 line 59-col.10 line 55;**



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the hash index may foster a subtree index based upon the number of iterations for shortening the mask length, wherein a new hash value/index is formed from the previous hash index).

n. Claims 14 and 21 are substantially equivalent to claim 7 and are therefore rejected under the same basis.

### *Conclusion*

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- a. *Waters et al* (USPN 6,430,527) disclose prefix circuitry and method.
- b. *Waters et al* (USPN 6,522,632) disclose an apparatus and method for an efficient prefix search.
- c. *Srinivasan et al* (USPN 6,460,112) disclose a method and apparatus for determining a longest prefix match in a content addressable memory device.
- d. *Romanov* (USPN 6,434,144) discloses a multi-level table lookup.
- e. *Melchior* (USPN 6,226,710) discloses a content addressable memory engine.
- f. *Lunteren* (USPN 6,782,382) discloses a prefix search method and data structure using compressed search tables.
- g. *Khanna et al* (USPN 6,539,455) disclose a method and apparatus for determining an exact match in a ternary content addressable memory device.
- h. *Hebb et al* (USPN 6,711,153) disclose a route lookup engine.
- i. *Greene* (USPN 6,778,530) discloses a method and apparatus for multiple field matching in a network device.
- j. *Filippi et al* (USPN 6,571,313) disclose memory for information searches through prefix analysis.
- k. *Brodnik et al* (USPN 6,266,706) disclose a fast routing lookup system using complete prefix tree, bit vector, and pointers in a routing table for determining where to route IP datagrams.
- l. *Bremer et al* (USPN 6,553,002) disclose an apparatus and method for routing data packets through a communications network.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kristie Shingles whose telephone number is 571-272-3888. The examiner can normally be reached on Monday-Friday 8:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rupal Dharia can be reached on 571-272-3880. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kristie Shingles  
Examiner  
Art Unit 2141

kds

  
RUPAL DHARIA  
SUPERVISORY PATENT EXAMINER